D-E99

Stereo cassette tape deck

Operating guide

BEFORE USING

To obtain the best performance and ensure years of trouble-free use, please read this operating guide carefully.

KEY TO ILLUSTRATIONS

① POWER (MAINS) SWITCH
② TIMER SWITCH
③ COUNTER RESET SWITCH
④ TAPE COUNTER
⑤ ELAPSED TIME RESET SWITCH
⑥ ELAPSED TIMER
⑦ DIGITAL PEAK METER
⑧ ATRS BUTTON
⑨ FIXED BUTTON
⑩ ATRS START BUTTON
⑪ BATTERY INDICATOR
⑫ TEST INDICATOR
⑬ DOLBY B/C NR CHANGEOVER SWITCH
⑭ DOLBY* NR SWITCH
⑮ MPX SWITCH
⑯ RECORDING LEVEL CONTROLS
⑰ INPUT SELECT SWITCH
⑱ HEADPHONE SOCKET
⑲ MICROPHONE SOCKETS
⑳ MONITOR SWITCH
㉑ TAPE SELECT BUTTONS
㉒ AUTO/MEMORY REWIND SWITCH
㉓ REC. MUTE BUTTON
㉔ PAUSE BUTTON
㉕ RECORD BUTTON
㉖ FAST FORWARD BUTTON
㉗ PLAYBACK BUTTON
㉘ STOP BUTTON
㉙ REWIND BUTTON
㉚ EJECT BUTTON
㉛ OUTPUT LEVEL CONTROL
㉜ LINE IN SOCKETS
㉝ LINE OUT SOCKETS
㉞ MEMORY BACK UP BATTERY COMPARTMENT
㉟ REMOTE CONTROL SOCKET
㊱ VOLTAGE SELECTOR
㊲ CONNECTIONS
㊳ CASSETTE MAINTENANCE
㊴ CLEANING

* Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

PRECAUTIONS

- This unit is designed so that other units can be stacked on it, but do not stack extremely heavy objects on it.
- Never use any strong detergent or solvent for cleaning the cabinet of this unit, because it could lead to damage of the surface finish.
- Protect the unit against excessive heat (e.g. direct sunshine), dust, shock hazards and moisture.
- Be sure not to open the cabinet.
- Be careful not to damage the power (mains) lead. Be sure to take hold of the plug when pulling it out; do not pull the lead.
- Disconnect the AC power (mains) lead plug from the AC outlet when the unit is not to be used for a long period of time or you are away from home.
- Do not stack in such a way that there is danger of blocking the ventilation holes. (Allow space near the ventilation holes if possible.)
- When using with other components, any component which can produce induction noise which can induce hum should be as far as possible from this deck. Bias leakage from this deck during recording may cause beats during reception of AM broadcasts, so be careful in placement of this deck with respect to the tuner; when beats occur, move them away from each other if possible. There is no problem in FM reception.

FEATURES

- **ATRS**
  The ATRS (Automatic Tape Response System) in this deck automatically detects the optimum bias, equalization and recording sensitivity for any tape in about 10 seconds and controls the recording circuit so as to obtain a flat frequency response with minimum distortion and fluctuations in output level so that the best possible performance of any cassette can be achieved. The ATRS data is stored in the microprocessor and can be recalled easily.
- **Smooth operation by means of the computer IC logic control**
  Light feather-touch operation has been made possible by use of the logic control with 2 motors, 3 solenoids and a computer IC.
  It is possible to change directly from the PLAY mode to the Fast Forward or Rewind mode, and vice versa without damaging the tape.
- **Close gap metal R & P combination head suitable for Metal Tape**
  A newly developed high density ferrite close-gap metal R & P combination head which can generate sufficient magnetic field for the high coercivity of Metal Tape is employed. In addition to the above, a special double-gap high hardness, high permeability, special permalloy erase head is used to fully erase high coercivity tape. As a result, the excellent characteristics of Metal Tape are displayed such as the wide frequency response, extended high frequency dynamic range, reduced distortion at high input levels, sharp improvement of S/N ratio in the high frequency band, etc.
- **Dolby C type NR system**
  Greater NR (noise reduction) effect than the conventional Dolby B type NR system commonly used can be obtained corresponding to the recent higher dynamic range program sources, and recording with improved high frequency response is possible.
- **Elapsed timer**
  Tape can be used more effectively because of the elapsed timer which shows the time the tape has run during play and record at a glance.
- **Computer memory rewind/Auto-rewind function**
  Repeating playback from the desired position is possible by means of the function of the computer IC.

The control circuit can be operated by means of the Hall IC at the end of the tape to rewind the tape automatically to enter the play mode (Auto-rewind play) or to enter the stop mode (Auto-rewind stop) after rewinding the tape.
It is very convenient because the tape can be returned to the tape start position after it has been listened to or after recording.

- **Tape standby mechanism**
  The leader tape at the start of tape can be taken up automatically by pressing the Fast forward button and Rewind button simultaneously; this is convenient in recording.
- **Computer automatic recording mute function**
  When the REC MUTE button is pressed during recording, the unit enters the non-signal mode by means of the function of the computer IC for approx. 4 sec, and then automatically enters the recording pause mode.
  This is convenient for cutting narrations or for leaving gaps between tunes.
- **Digital peak meter with 2 colours and highly accurate level indication is used**
  The white and red graph corresponds to the strength of the input/output signal, and it is displayed as such.
  Since it has rapid speed of response, the display always indicates the peak level very accurately.
  Very accurate level setting is possible.
  The series indication of both R/L channels enables the individual reading of left/right levels with ease, and checking the level is also easy.
  The peak level is held for approx. 1 sec.
- **Timer mechanism for unattended recording and alarm playback**
  With an external audio timer connected, automatic recording and waking up to music in place of an alarm at any desired time is possible.
- **Remote control operation**
  Remote control operation is possible using a remote control device.
- **With Metal Tape switch**
  The metal position switch for use with Metal Tape fully displays the performance of this new tape.

POWER REQUIREMENT

To Set Power (Mains) Voltage:

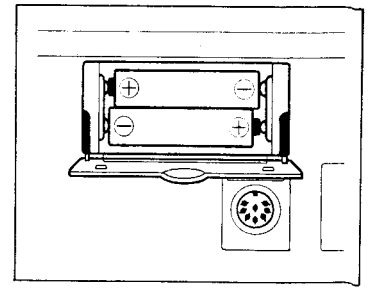
1. This unit can be used with a power (mains) voltage of 100 to 110 V, 115 to 127 V, 200 to 220 V or 230 to 250 V. Before operating, be sure to check that it is set to your local power (mains) voltage.
2. Turn the voltage selector ㊱ to your local power (mains) voltage with a screwdriver until the selector clicks.

Notes: 1. Before turning the selector, disconnect the AC power (mains) lead from the AC outlet with this unit in stop mode.
2. Be sure not to turn the selector with a thin screwdriver, etc. by force. The selector may be broken and the deck will not operate.
3. When inserting the mains plug into the AC outlet supplying 100 — 110/115 — 127 V, insert the plug with adaptor connected to it.

Memory back up batteries

Open the battery compartment by pulling its top towards you and insert 2 R6 batteries; be careful not to confuse the polarity. These batteries protect the ATRS data when the power is switched off and in the case of a power failure. The batteries have a service life of one year or more. When they are exhausted, when the power is switched on, Battery indicator ⑪ flashes.

Note: Use a straight screwdriver when it is difficult to open the battery compartment.



CONNECTIONS

This unit is not equipped with a built-in power amplifier; therefore it must be connected to a playback unit (stereo amplifier). The connection should preferably be done using the US pin sockets ㉜ and ㉝. (See diagram ㊲)
Insert the AC power (mains) lead plug into the power (mains) socket of stereo amplifier or into any convenient AC outlet.
Note: Disconnect the AC power (mains) lead plug from AC outlet when the unit is not to be used for a long period of time or you are away from home.

FUNCTIONS

TAPE SELECT BUTTONS ㉑
Press these buttons, matching them to the tape to be recorded or played back.
In order to avoid faulty recording, these buttons should be checked before recording is made.

To obtain the best performance from this unit, it is recommended that you use the tapes: HITACHI-UD, HITACHI-ER (NOR-I position), HITACHI-EX (CrO2-II position) and HITACHI-ME (METAL-IV position).
A high recording level with a wide dynamic range can be obtained.

OUTPUT LEVEL CONTROL
The output level should be adjusted by use of the Output level control ㉛, in order to match the input sensitivity of the power amplifier to which the unit is connected.

INPUT SELECT SWITCH
Set this switch ⑰ to match the program sources to be recorded:
LINE (⏍): Set to this position for recording from the Line in sockets ㉜.
MIC (⏏): Set to this position for recording from the Microphone sockets ⑲.

DOLBY NR (Noise Reduction) SWITCH ⑭
ON: Set to this position when recording utilizing the Dolby NR system or playing back cassette tapes recorded through a Dolby NR system.
OFF: Set to this position when playing back cassette tapes not recorded through a Dolby NR system or making a recording not utilizing the Dolby NR system.
Dolby encoded pre-recorded cassette releases are widely available, and should be played with appropriate Dolby noise reduction selected. Cassettes recorded with Dolby B-type noise reduction are identified on the box's spine and the cassette label with the DOLBY symbol, and on the liner's front cover with the DOLBY SYSTEM® symbol. Cassettes recorded with Dolby C-type noise reduction are identified with the DOLBY C NR and DOLBY C NR symbols.

MPX SWITCH ⑮
ON: Set to this position when recording FM stereo broadcasting utilizing a Dolby NR system.
OFF: Set to this position when recording the broadcasting except an FM stereo through a Dolby NR system.

REMOTE CONTROL SOCKET
By connecting a remote controller to the Remote control socket ㉟, the movement of the tape can be controlled by this controller.

TIMER SWITCH (TIMER)
Set this switch ② to OFF when a timer is not used.
Set to REC or PLAY for recording when you are absent or for timer PLAY.
(Refer to "Recording and playback using an external audio timer" on Page 8—9 for details.)
Note: If the Timer switch is set to REC when the Power switch is turned ON, PLAY indicator and REC indicator flash for 3 sec. to warn you. If the Timer switch is set to PLAY, only PLAY indicator flashes.
To stop the indicator flashing (warning the position of the timer switch), set the timer switch to OFF after turning the power switch OFF. Then, turn the power switch ON again and start recording or playback.

COMPUTER AUTOMATIC RECORDING MUTE FUNCTION

When the REC MUTE button ㉓ is pressed during recording, the unit enters the non-signal mode for approx. 4 sec. and then automatically enters the recording pause mode.
Press the Playback button ㉗ to continue recording.
When the REC. MUTE button ㉓ is pressed continuously, the non-signal mode continues for more than 4 sec; when it is released, the unit automatically enters the recording pause mode.
This is convenient for cutting narrations or leaving gaps between tunes.

MONITOR SWITCH (MONITOR) ⑳

Since a 3-head system is used in this unit, the recorded signal can be played back immediately after it has been recorded using US pin leads.

TAPE: Sounds recorded on the tape can be monitored as playback sound via the amp.
* Be sure to set the switch to "TAPE" for playback.
When it is set to "SOURCE", no sound will be heard.

SOURCE: The source sound can be monitored.

ELAPSED TIMER ⑥

The elasped timer indicates the time the tape has been transported in play or record in minutes and seconds. Press the Elapsed time reset switch ⑤ to reset the indicator.

ATRS FUNCTION

When ATRS start button ⑩ is pressed in the REC or REC -PAUSE mode, the deck enters the ATRS mode; Test indicator ⑫ flashes during the operation of ATRS.

Note: When a damaged tape or tape outside the range of ATRS calibration is used, ATRS operation stops midway and the speed with which Test indicator ⑫ flashes increases.

Press Fixed button ⑨ to record without using ATRS. To record on a tape previously used for ATRS calibration, press ATRS button ⑧.

CASSETTE INSERTION

When the Eject button ㉚ is pressed, the cassette holder comes out toward you gradually. Insert the cassette with the exposed tape downward until it is locked, then close the cassette holder. For cassette removal, press the Eject button ㉚ with the unit in the STOP mode and the cassette holder opens toward you for easy removal.

RECORDING

Recording from a stereo system

1. Connect this unit and the stereo system using US pin-type leads.
2. Set the Power switch ① to ON, insert the cassette with the side to be recorded toward you and close the cassette holder.
3. Press the correct Tape select button ㉑ to match the type of tape.
4. Set the Input select switch ⑰ to "LINE".
5. Set the Dolby NR switch ⑭ to ON. (Set to OFF for recording without the Dolby NR circuit.)
6. Set the Dolby B/C NR changeover switch ⑬ to the desired position.
7. Set the MPX switch ⑮ to ON for recording an FM stereo broadcasting.
8. Set the Monitor switch ⑳ to "SOURCE".
9. When the Pause button ㉔ is pressed while pressing the Record button ㉕, it enters the recording stand-by mode.
   Adjust the Recording level controls ⑯ so that the indication of the Digital peak meter ⑦ does not exceed +3 dB at maximum input.
10. Set the Auto/Memory rewind switch ㉒ to the desired position (Refer to "Auto/Memory rewind switch" on Page 8) and press the Counter reset switch ③ so that the reading is "000".
11. Start recording by pressing the Playback button ㉗.
12. When it is desired to stop recording temporarily during recording, press the Pause button ㉔. Press the Playback button ㉗ to continue recording.

13. Press the REC. MUTE button ㉓ to cut the sound being recorded.
    4 sec. later, the unit automatically enters the recording pause mode. Press the Playback button to continue recording.
14. Press the Stop button ㉘ when the recording is completed.
    When the recording is done up to the end of tape, operation is according to the position of the Auto/Memory rewind switch ㉒.

Caution: Do not turn the Power switch ① ON/OFF abruptly during recording as it may cause misoperation.

Recording using ATRS

If truly high fidelity recordings are to be made, bias, equalization and sensitivity should match the tape being used. On an ordinary tape deck, these are selected by the tape select switch; in this deck the values selected using the tape select buttons are further improved by the ATRS which uses a microprocessor to set values which are optimum for the tape being used. This optimizes frequency response, and minimizes distortion and fluctuations in output level.

ATRS Operation

1. Set the Power switch ① to ON and insert a cassette.
2. Press the correct Tape select button ㉑ to match the type of tape.
3. Press the Record button ㉕ and Pause button ㉔ simultaneously.
4. Press the ATRS start button ⑩. (ATRS button ⑧ lights and the Test indicator ⑫ flashes.)

ATRS operation now starts. It stops in about 10 seconds and the tape is automatically rewound to the point where the ATRS start button ⑩ was pressed. Tape data obtained by ATRS is stored in microprocessor memory.

* By changing the settings of the tape select buttons, data for four types of tape can be held, one each for the NOR-I, CrO_2-II, FeCr-III and METAL-IV positions.

Cautions during the operation of ATRS

- Press the correct Tape select button ㉑ to match the tape being used. Incorrect data will be stored when the wrong button is selected.
- When the tape has extremely low sensitivity or is outside the range of ATRS calibration, correct operation will not be performed so that ATRS is released automatically and an error is indicated. (Fixed button ⑨ lights and the Test indicator ⑫ flashes at high frequency.)
- When ATRS is used at the leader tape at the start of the tape, the deck automatically enters the FF mode and then, after the leader tape has been wound, it automatically enters the ATRS mode again.
- When the operation button, tape select button, fixed button or power switch is operated during ATRS operation, ATRS operation is released so be careful.
- When ATRS operation starts at the end of tape and the tape finishes before ATRS has finished operation, the full auto stop mechanism operates, ATRS operation is released and the deck enters the stop mode.
- When ATRS operation is performed for a certain type of tape, previous ATRS data for that type of tape is overwritten in memory and the new data is stored.

When recording immediately after ATRS operation

1. Operate as described in 1—4, ATRS operation.
2. Operate as described in 4—14, Recording from a stereo system.

When recording using previous ATRS data

1. Set the Power switch ① to ON and insert the cassette.
2. Press the correct Tape select button ㉑ to match the type of tape.
3. Press the ATRS button ⑧.
   Check that the ATRS button lights at this time. If it does not light, it shows that data is not held in memory for this type of tape. In this case, use ATRS.
4. Operate as described in 4—14, Recording from a stereo system.

Tape standby function

Use when recording from the beginning of tape; the leader tape is taken up automatically so that the beginning of the music is not missed.
Press the Fast forward button ㉖ and Rewind button ㉙ simultaneously then release the Rewind button ㉙ after releasing the Fast forward button ㉖.
The PAUSE indicator flashes and the tape is rewound. When the tape is fully rewound, the deck enters the FF mode and stops after winding the leader tape.

Recording from microphones

Insert two microphones into the Microphone sockets ⑲.
Carry out the following procedure the same as in "recording from a stereo system".
For monaural recording, connect one microphone plug to the Microphone socket ⑲ marked L/mono.
Note: Set the Input select switch ⑰ to "MIC".

Cautions on the use of Metal Tape

1. Some Metal Tape is incompletely coated with magnetic powder which causes level fluctuation, so it is recommended to clean the heads, capstans and pressure rollers after it is used several times. (When cleaning, be careful not to apply too much force to the head because it may cause the high frequency characteristics to deteriorate.)
2. Metal Tape recorded on this deck can be played back on another deck which does not have a Metal select switch position. In this case, set the tape select switch to CrO_2 or FeCr for playback.

Monitoring when recording with US pin leads

Since the REC head and PLAY head are independent in this unit, the original sound being recorded can be monitored by changing over the monitor switch to "SOURCE" during recording, and the sound recorded on the tape can be monitored with the monitor switch changed over to "TAPE". Checking whether or not the recording level is adequate, or whether tone quality has deteriorated due to the dirty heads is possible.
There are following two ways of monitoring through the speakers:

- Set the monitor switch of the amplifier to "TAPE", and change over the monitor switch of this unit between "TAPE" and "SOURCE".
- Set the monitor switch of this unit to "TAPE" and change over the monitor switch of the amplifier between "TAPE" and "SOURCE".

PLAYBACK

1. Turn the Power switch ① ON and insert the tape to be played back.
2. Press the correct Tape select button ㉑ to match the type of tape.
3. Set the Dolby noise reduction switch ⑭ to "ON" or "OFF" and Dolby B/C NR change over switch ⑬ to "B-TYPE" or "C-TYPE" depending on whether or not the tape was recorded with Dolby B or C type NR system.
4. Set the Auto/memory rewind switch ㉒ to the desired position.
5. Press the Playback button ㉗ to start playback. Adjust volume, tone and balance with the stereo amplifier controls.
6. When it is desired to stop the tape during playback, press the Pause button ㉔. Press the Playback button ㉗ to start playing again.
7. Press the Stop button ㉘ when playing is completed. When the tape is played up to the end, operation will depend on the position of the Auto/memory rewind switch ㉒.
   Operate this unit with the volume knob of the stereo system set to the position used when listening to broadcasts or records, and adjust to obtain the same volume using the Output level control ㉛.
   Caution: When the Output level control ㉛ is set to minimum, no sound comes out.

AUTO/MEMORY REWIND SWITCH

Auto-rewind function

Stop, rewind or play can be done automatically depending on the setting of the Auto/memory rewind switch ㉒.

OPERATION MODE	AUTO/MEMORY REWIND SWITCH SETTING	AT TAPE END
Recording	OFF	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play....(repeated)
Playback	OFF	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play.... (repeated)
Rewind	OFF	Stop (AUTO STOP)
	STOP	
	PLAY	* Play ➡ rewind ➡ play ➡ rewind ➡ play....(repeated)
Fast Forward	OFF	Stop (AUTO STOP)
	STOP	Rewind to start ➡ stop (AUTO STOP)
	PLAY	* Rewind to start ➡ play ➡ rewind ➡ play....(repeated)

* Tape is played back 16 times by Auto-rewind function.

Computer memory rewind function

When the Rewind button is pressed during recording or playback, the tape is rewound to the position previously specified (the position where the Playback button was pressed previously).
The unit operates according to the setting of the Auto/Memory rewind switch after rewinding.

PLAY - Playback starts after rewinding.
STOP - STOP mode is entered after rewinding.

Note: When tape is rewound to its end, the computer memory rewind function is released and the unit operates according to the setting of the Auto-rewind switch.

RECORDING AND PLAYBACK USING AN EXTERNAL AUDIO TIMER

When this tape deck is used with an audio timer, timer recording or playback at the desired time is possible.

Timer recording of radio broadcasts

1. Insert the power lead of this unit into the socket of the amplifier. (Insert the power lead of the amplifier into the socket of the timer.)
2. Turn the power for the amplifier and tuner ON.
3. Operate as described in items 1 — 9 in "RECORDING", adjust the recording level and press the Stop button ㉘.
4. Set the Auto/memory rewind switch ㉒ to OFF or STOP.
   Note: Do not set the switch to "PLAY" during timer recording.

5. Set the Timer switch ② to "REC".
   Note: If this switch is set to "PLAY" and the timer functions, the deck enters the playback mode, so recording cannot be done.
   When it is set to "OFF", the deck does not operate at the set time. Be careful.
6. Set the timer to the desired time.
   (Refer to the operating guide of the timer for setting the timer.)
   (Now, preparation is complete.)
7. Recording starts automatically at the set time.

Timer PLAY

1. Insert the tape you desire to play back, adjust the volume knob of the amplifier to determine the level and press the Stop button ㉘.
2. Connect the timer in the same way as in the "Timer recording of radio broadcasts" and set the timer to the desired time.
3. With the Timer switch ② set to "PLAY", PLAY starts automatically at the set time.

Cautions

- Do not use a cassette with its erasure prevention tabs snapped for recording. When a cassette with its tabs snapped is used, the unit operates in the PLAY mode when the timer operates. Be careful because the chance to make a unique recording might be missed.
- Be sure to set the Timer switch (TIMER) to "OFF" except for TIMER recording/playback. When the Timer switch (TIMER) is set to REC or PLAY, recording or play starts automatically a few seconds after the power switch is turned ON.
- Be careful; when the erasure prevention tabs are present, the previously recorded tape will be erased.
- Do not open/close the cassette lid for several seconds after the power is switched ON to protect the mechanism.
- Do not use timer recording or playback when you are absent for a long time.

ERASING

When a recording is being made, any sound already on the tracks is automatically erased before the new recording is made. Erasure is accomplished only when the deck is in the recording mode. If you wish to erase a tape without making a new recording, set the Recording level controls ⑯ at minimum, and press the correct Tape select button ㉑ to match the type of tape. Press the Playback button ㉗ while pressing the Record button ㉕.
For erasing with less noise, remove input leads, etc.

MAINTENANCE

In order to keep this unit in optimum operational condition, clean the heads, capstans and pressure rollers periodically with a head cleaning stick moistened in alcohol, or methylated spirit. (See diagram ㊴ .) When the Eject button ㉚ is pressed, the cassette holder comes out toward you gradually. Never use a sharp or metallic instrument or tool for cleaning these parts.
The easiest cleaning can be performed by using a Hitachi head cleaning cassette. Hitachi cassette is provided with two pieces of head cleaning tapes on both ends of the tape; therefore, all accumulated dirt and oxide particles are removed automatically at the beginning and the end of the tape.
Demagnetization: The head is inevitably magnetized slightly after being used for a long time. As a result, high-frequency sound may be lacking or noise may be generated. Perform demagnetization of the head occasionally with a head eraser. In this case, do not touch the tape running surface of the head directly with the metallic part of the eraser, but use the eraser after protecting the head with cloth or gauze.

CASSETTE TAPES

Recording Protection: If the plastic tabs on the rear of the cassette are punched out (by a screwdriver or similar tool), the recordings can be protected against accidental erasure.
When only one side of the cassette is to be protected, with the blank side of the cassette towards you, punch out the tab on right. (See diagram ㊳.)
Precautions: If a tape is played several times continuously, especially if a thin tape (C-90, C-120) is used, the tape might be wound too tightly on the reel and cause the tape speed to fluctuate. In order to avoid this, it is recommended to tap the cassette several times lightly on a table-top which will loosen the tape on the reel. But the tape should not be too loose. Especially after fast forwarding or rewinding a C-90 or C-120 cassette, the slack should be taken up by inserting a pencil or other object in the spindle hole and tightening the tape.
4-Track Recording/Playback: After recording or playing back one side of the cassette, remove the tape by depressing the Eject button ㉚, turn the cassette over and insert it again. Then, the tape can be used again for the same recording time as the first side.

DOLBY* NR (Noise Reduction) SYSTEM

This cassette deck is equipped with both Dolby C-type and B-type noise reduction. The new Dolby C-type NR system provides noise reduction beginning at 100 Hz and rising to 20 dB at 1 kHz and above. The standard Dolby B-type NR system, used in virtually every high-performance cassette deck for the past several years, provides noise reduction beginning at about 500 Hz, rising to 10 dB at 4 kHz and above.

With Dolby C NR and a good tape formulation, tape noise is below that of just about any program material you might record, including music with very wide dynamic range. Even when you play Dolby C recordings at very high volume levels, any remaining noise is likely to be that of the original program material, not noise from the tape or recorder. Standard Dolby B-type NR will allow you to play cassettes previously recorded with it, and to make cassettes you know will be played primarily on machines equipped only with Dolby B.

Both Dolby noise reduction systems work in a similar way. Neither system improves what is being recorded, but rather prevents the addition of noise by the tape recording process. When a recording is made, the Dolby noise reduction circuit makes higher frequencies on quiet passages louder than normal. When the encoded tape is then played with Dolby noise reduction, the circuit lowers the previously-boosted frequencies to where they were in the original program material, thereby reducing the noise added by the taping process.

Dolby C-type noise reduction achieves more noise reduction than Dolby B by boosting low-level higher frequencies, and lowering them again on playback, by a greater amount than Dolby B. In addition, the noise reduction extends about two octaves lower, so that the noise reduction effect is subjectively uniform across the audible spectrum. Dolby C also incorporates two further features, called spectral skewing and anti-saturation, which permit more accurate recording of high-level high frequencies, among other benefits.

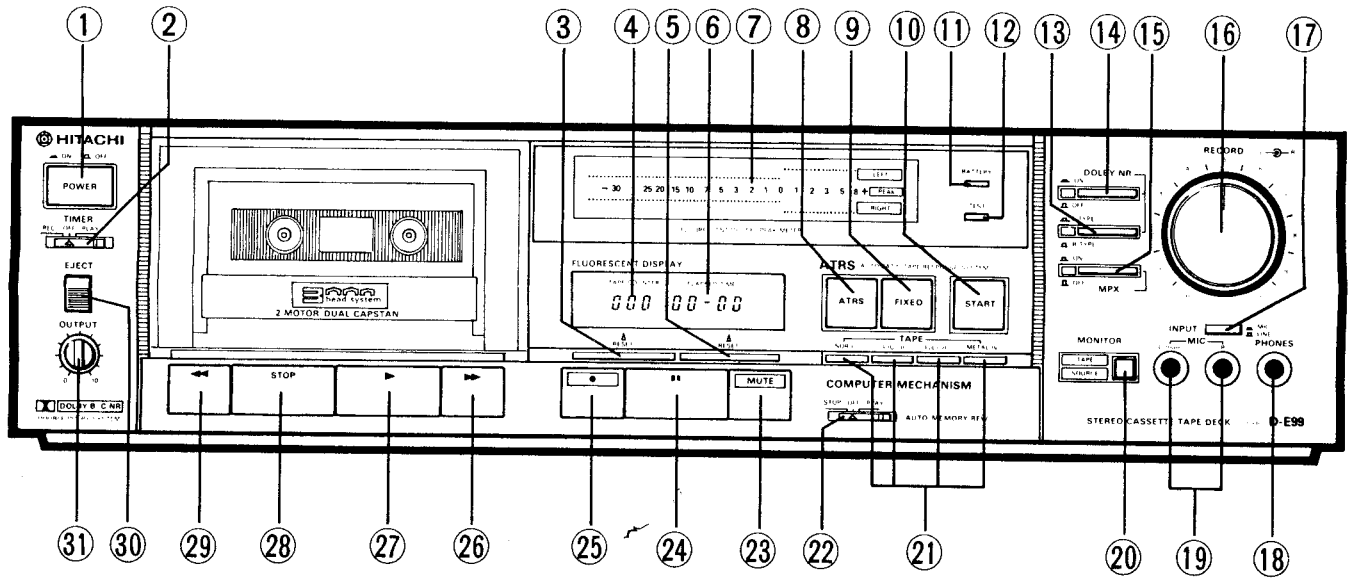
SPECIFICATIONS

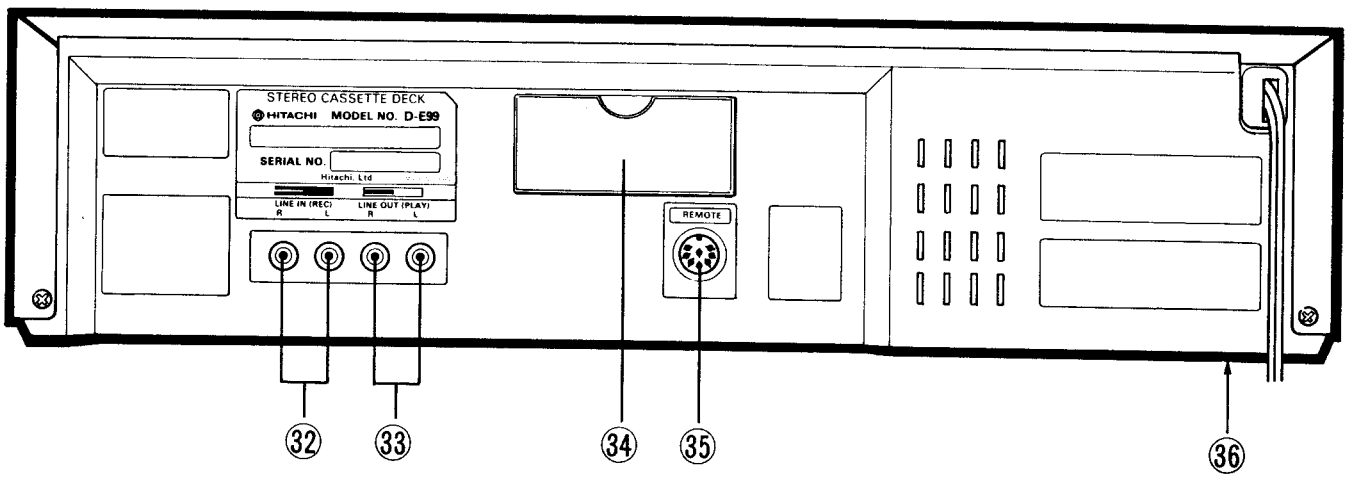
Semiconductors:	Modules: 5 FETs: 2 ICs: 11 Transistors: 58 Diodes: 58 LEDs: 14
Track System:	4 track 2 channel stereo
Tape:	Cassette tape
Tape Speed:	4.75 cm/s
Recording system and Bias Frequency:	AC bias, 105 kHz
Erasing System:	AC erase
Erase Ratio:	65 dB (at 1 kHz) or more
Frequency Response:	NOR-I: 20 Hz to 19 kHz 25 Hz to 18 kHz (According to DIN 45 500) CrO_2-II: 20 Hz to 21 kHz 25 Hz to 19 kHz (According to DIN 45 500) FeCr-III: 20 Hz to 19 kHz 25 Hz to 18 kHz (According to DIN 45 500) METAL-IV: 20 Hz to 21 kHz 25 Hz to 20 kHz (According to DIN 45 500)
S/N (Signal to Noise Ratio):	Dolby B NR ON: 69 dB (A weighted, Reference 3% T.H.D. Metal Tape. According to DIN 45 500.) Dolby C NR ON: 75 dB (A weighted, Reference 3% T.H.D. Metal Tape. According to DIN 45 500.) Dolby NR OFF: 61 dB (A weighted, Reference 3% T.H.D. Metal Tape. According to DIN 45 500.)
Wow & Flutter:	0.032% (WRMS) 0.10% (According to DIN 45 500)
Input Sensitivity and Impedance:	Microphone: 0.4 mV (Suitable microphone impedance 300 ohms to 5 kohms) Line in: 100 mV, 50 kohms
Output level:	0.5V or more (adjustable)
Output Load Impedance:	Line out: 50 kohms Headphone: 8 ohms to 2 kohms (Suitable)
Distortion:	Less than 0.8% (1 kHz, 160 nWb/m)
Crosstalk:	60 dB (at 1 kHz) or more
Power (Mains) Supply:	AC 100—110V, 115—127V, 200—220V, 230—250V, 50/60 Hz
Power (Mains) Consumption:	29W
Dimensions:	110(H) x 435(W) x 282(D) mm
Weight:	6.3 kg

* Specifications are subject to change without notice for performance improvement.

D-E99

HITACHI





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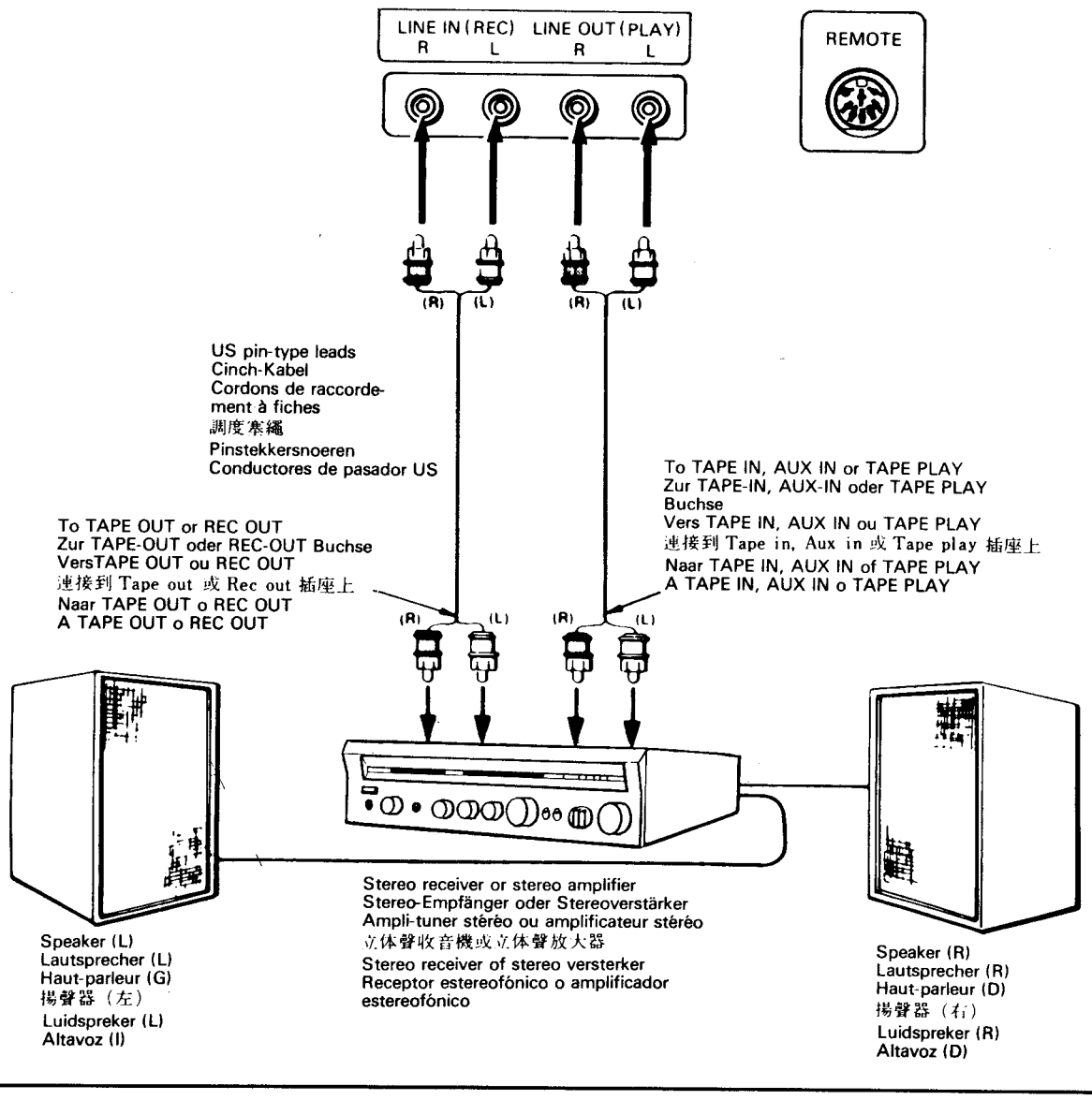
LINE IN (REC) R L
LINE OUT (PLAY) R L
REMOTE
(R) (L) (R) (L)
US pin-type leads
Cinch-Kabel
Cordons de raccordement à fiches
調度塞繩
Pinstekkersnoeren
Conductores de pasador US
To TAPE IN, AUX IN or TAPE PLAY
Zur TAPE-IN, AUX-IN oder TAPE PLAY Buchse
Vers TAPE IN, AUX IN ou TAPE PLAY
連接到 Tape in, Aux in 或 Tape play 插座上
Naar TAPE IN, AUX IN of TAPE PLAY
A TAPE IN, AUX IN o TAPE PLAY
To TAPE OUT or REC OUT
Zur TAPE-OUT oder REC-OUT Buchse
VersTAPE OUT ou REC OUT
連接到 Tape out 或 Rec out 插座上
Naar TAPE OUT o REC OUT
A TAPE OUT o REC OUT
Speaker (L)
Lautsprecher (L)
Haut-parleur (G)
揚聲器（左）
Luidspreker (L)
Altavoz (I)
Stereo receiver or stereo amplifier
Stereo-Empfänger oder Stereoverstärker
Ampli-tuner stéréo ou amplificateur stéréo
立体聲收音機或立体聲放大器
Stereo receiver of stereo versterker
Receptor estereofónico o amplificador estereofónico
Speaker (R)
Lautsprecher (R)
Haut-parleur (D)
揚聲器（右）
Luidspreker (R)
Altavoz (D)

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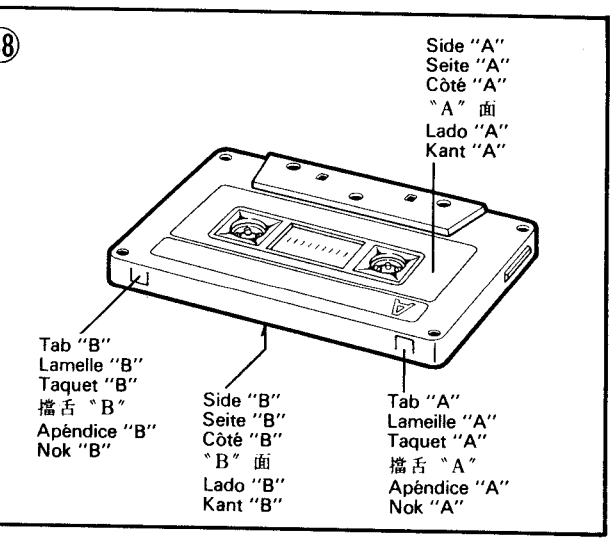

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